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Philipp W. Stockhammer and Joseph Maran, eds. *Appropriating Innovations: Entangled Knowledge in Eurasia 5000–1500 BCE* (Oxford & Philadelphia: Oxbow, 2017, iv and 268pp., several colour and b/w illustrations and maps, hbk, ISBN 978-1-78570-724-7)

Archaeology is experiencing yet another paradigm shift. During the last few years, mobility and connectivity have become key themes of enquiry in archaeological investigation. This can be linked to a broader ‘mobility turn’ experienced in the social sciences, especially in human geography (Cresswell, 2011), with a renewed focus on the movements of people (e.g. human migration), things, and knowledge and the social consequences of these. But in archaeology, this renewed focus has been triggered also by key developments in archaeological theory and science, such as ontological and relational thinking (e.g. Actor-Network-Theory, entanglement and assemblage theories, relational biographies and itineraries), the broader adoption of post-colonial theory (e.g. hybridization and transculturation), and advances in provenancing (e.g. by means of stable isotope analysis) and ancient DNA.

Several edited volumes on archaeological mobility have been published in recent years. Some focus on the movement of things and how these mediated intercultural contacts, social relations, and identities in the ancient Mediterranean and Near East (van Dommelen & Knapp, 2010; Maran & Stockhammer, 2012). Others have a more explicit emphasis on the theoretical underpinnings of what it means to develop an archaeology of mobility, by focusing on the trajectories of

people and things (Beaudry & Parno, 2013) and itineraries and biographies of things (Hahn & Weiss, 2013; Joyce & Gillespie, 2015). The transmission/adoption of knowledge has also been addressed in two novel volumes (Roddick & Stahl, 2016; Kiriati & Knappett, 2016), both drawing on the influential notion of ‘communities of practice’ (Lave & Wenger, 1991), which addresses how situated learning and communities of practice mediate the emergence of knowledge and relations/connectivity across multiple temporal and spatial scales. The volume edited by Kiriati and Knappett (2016) focuses specifically on how technological knowledge was transmitted and adopted/appropriated across the eastern Mediterranean (mainly the Aegean) in late prehistory (Late Neolithic to Iron Age). As Knappett and Kiriati state in the introduction to that volume, technological change ‘is not always a process of pure invention and innovation, but also is often a matter of technological transfer, transmission, and translation.’ (Knappett & Kiriati, 2016: 8)

It is precisely these themes of transfer, translation, and appropriation of technological innovations that are the main focus of *Appropriating Innovations*, which collects papers presented at an international conference with the same title held in 2015, organized by the editors as part of the activities of the Cluster of Excellence

Asia and Europe in a Global Context, Heidelberg University. The geographical scope of *Appropriating Innovations* is broader than—and complementary to—that of the book edited by Kiriati and Knappett (2016), as it extends from China to central and north-western Europe, and from southern Mesopotamia to Russia. Thematically, contributions to *Appropriating Innovations* concentrate on the transmission/appropriation of two key technological innovations: secondary animal products and metallurgy.

As the volume's editors state in their very brief Introduction, the aim of this collection of papers is to move beyond the traditional focus on the 'origins' of technological innovations and the dichotomy between diffusionism *versus* autochthonism, which is still ingrained in several academic traditions (e.g. German and Spanish, to name but two), and move towards 'translation'—that is, a focus on 'how these innovations were ingested by societies and how this affected the lives and worldviews of the people constituting them' (p. 2). Maran and Stockhammer do not discuss the theoretical underpinnings of the term 'translation' or deal with the relevant literature, also archaeological, on post-colonial theories of cultural translation, transculturalism, and hybridity (Bhabha, 2004)—which emphasize translation as a cultural process, focus on hybridity to overcome oppositions, and explore the links between the movement of people and the shaping of cultures—or with the '*sociologie de la traduction*' (aka Actor-Network-Theory). This is unfortunate, since it is a lost opportunity to present a robust theoretical and methodological framework to approach the transmission and appropriation of technological knowledge in archaeology, which would complement well the perspective developed by Knappett and Kiriati (2016) in their edited volume.

Nonetheless, Maran and Stockhammer do outline some key issues to be considered when developing research on the topic: 1) that the transfer of technological innovation requires personal contact; 2) that the exchange of knowledge takes place in the context of encounters with people from distant places; 3) that technological knowledge has to be translated into particular world-views. The editors briefly mention networks and nodes (i.e. agents, actants), and the concept of 'adoption environment', although these are not assessed in depth. An interesting paper that serves as a complement to the Introduction is Chapter 2, by Schubert, a sociologist, who reviews old and new theories related to innovation, technology, and social change. He emphasizes the emergent character of social and technical change, the need to consider innovation as a social process, the importance of the role of users, and the creative adaptation of technologies in different contexts. A stimulating suggestion derived from evolutionary economics and innovation sociology is also advanced, namely that elites are usually conservative and that those in marginal positions are more likely to engage in revolutionary innovations—an important point for archaeology if we are to locate contexts of innovation.

The remaining nineteen chapters are ordered according to three main innovations: writing (Ch. 3), secondary products (Chs 4–11), and metallurgy (Chs 12–21), although Chapters 6 and 13 deal jointly with the last two. Chapter 3, by Sauer, discusses the emergence of writing as a social process considering multiple relations in the Chalcolithic of southern Mesopotamia. The chapter feels somewhat disconnected from the remainder of the book, but it makes a valuable contribution as it considers the rejection of innovations, in this case centres interacting with Uruk (e.g. Arslantepe) that did not adopt its

preliterate accounting tools or writing (p. 24).

In Chapter 6 Greenfield presents an overview of production intensification in the Near East and Europe between the Late Neolithic (LN) and the Early Bronze Age (EBA). He discusses how milking goats since the early Neolithic, the exploitation of sheep (and cattle) for secondary products in the Chalcolithic, and the utilitarian use of bronze metallurgy (i.e. for butchering) since the EBA, all led to production intensification. He then briefly reflects on the social impact of these new technologies, emphasizing the need for more research on processes of intensification and specialization. D'Anna and Palumbi (Ch. 4) present precisely such data from Arslantepe in eastern Anatolia, revealing that the intensification of husbandry strategies during the fourth millennium BC was not only connected to the production of milk, wool, textiles, and cheese but also—and primarily—to the production of meat. The authors underline that secondary products cannot be considered as part of a unitary linear process of innovation, and that there were different processes of adoption and selection of techniques according to different social, cultural, and economic contexts. A more generalizing perspective is presented by Ivanova (Ch. 5) in regards to animal traction, as she considers this innovation a result of the adjustment and extension of traditional farming practices, not of a top-down introduction, in mid-fourth millennium BC Europe.

Burmeister (Ch. 7) discusses the appearance of wheeled vehicles in Eurasia in the fourth millennium BC and the rapid spread of this innovation which, he suggests, was passed on via knowledge transfer as a mental template (i.e. as 'prestigious knowledge' of interest to elites), probably through long-established distribution networks. In support of this

hypothesis he discusses the significant variability in the manufacturing techniques of early wagon parts documented from the Eurasian steppes to north-western Europe. Klimscha (Ch. 13), who explores large-scale modelling of prehistoric innovation processes (i.e. wagons and metallurgy), argues that innovations are 'socially embedded' and take place within spheres of interaction (p. 156), and emphasizes the need for more research on spheres of interaction and technology. In a similar vein, Leppek (Ch. 9), who focuses on the traction complex as 'technology cluster' across fourth millennium BC Europe, highlights the need to refocus research on local appropriation processes to understand their impact at broader scales and their longer-term developments.

Three chapters examine processes of appropriation of animal traction and wheeled vehicles in different settings through specific case studies. Reinhold and colleagues (Ch. 8) present contrasting patterns of appropriation (translation) of animal (i.e. cattle) traction and wheeled vehicles in Maikop North Caucasus communities and those from the neighbouring steppes during the last third of the fourth millennium BC. The authors show how the symbolic dimension of the activities in which draught animals were involved triggered different 'representations' of traction in the mortuary contexts of those two systems: cattle skulls were deposited in Maikop burials (and are read as representing 'power', i.e. a narrative of mastering the beast) and wagons in Yamnaya burials (interpreted as representing 'mobility'). Importantly, isotopic analysis of a sample of the human individuals buried with wagons or cattle offerings in those two regions indicates that they were local and had the same diet as the rest of the population investigated, not offering any indication of them as belonging to social elites or having special mobility patterns.

Furthermore, it is interesting to note that women and children were also supplied with wagons among Yamnaya communities (p. 92). Back in Western Europe, Maran (Ch. 10) identifies patterns of ritual deposition of wooden parts of wheeled vehicles found in two regions during the third millennium BC, the 'uninhabited' wetlands of northwest Europe and the wetland settlements in the Circum-Alpine region, and links them to a common ideological structure that emerged in those communities after the first introduction of wheeled vehicles (p. 118). Finally, Johannsen (Ch. 11) uses various lines of evidence to outline how different trajectories of draught cattle technologies shaped different socioeconomic and cultural developments in north-western Jutland and south-eastern Scandinavia during the fourth and third millennia BC.

The chapters dealing with metallurgy are varied but all offer interesting insights. Hansen (Ch. 12) explores the early stages of copper alloying and lost-wax casting in Eurasia, highlighting, among others, how these technologies built upon Neolithic ones. Links to pre-existing technologies and the social dimension of innovations are emphasized by Helwing (Ch. 14) and Fragipane (Ch. 15), who through a comparative analysis of the evidence of early metallurgy in southwest Asia (Helwing) and the evidence unearthed in Arslantepe (Eastern Anatolia, Fragipane) argue for a preeminent social (symbolic) role of early copper metallurgy in the region. Finally, five chapters deal with the appropriation and use of bronze. Rahmstorf (Ch. 16) presents a survey of the appearance of bronze before 2200/2100 BC between the Atlantic and north-west India. He detects complex patterns but confirms that generally the first tin bronze objects are elements of adornment, weapons and tools; there are no clear preferences. In the context of this macro-region, Pereira (Ch. 18) discusses the relevant role that Gonur

Depe (Turkmenistan) played as a link between the steppe and the Indus valley within the Middle Asian Interaction Sphere. The role of existing technologies and traditions in shaping the appropriation of early bronze technology are discussed by Wischniewski (Ch. 17) for EBA Mesopotamia and Mei and colleagues (Ch. 19) for the Central Plains of China. Also, Horn (Ch. 21) argues that innovations in weapon technology in Europe during the EBA were deeply rooted in the LN, highlighting consistency in combat style as a precondition for the adoption of new kinds of weapons in bronze.

The previous supra-regional analyses and chapters underlining elements of continuity within change are supplemented with the results of the micro-historical, multidisciplinary investigation conducted in the Lech valley (Germany), aimed at discerning patterns of transformation between the LN and the Middle Bronze Age (2900–1500 BC, Ch. 20, by Massy et al.). There, a representative sample of human remains from four small cemeteries associated with individual hamlets was investigated by applying isotopic and DNA analysis, and a large sample of associated metal objects analysed by means of XRF spectrometry. The results suggest a combination of long-distance human mobility with continuous settlement in the valley, and a puzzling disappearance of tin bronze during the EBA (after a Bell Beaker phase with tin bronze objects), which is linked by the authors to transformations in supply networks.

The aim of this book was to move beyond the traditional focus on 'origins' and redirect the attention onto 'translation', that is, to promote research on processes of appropriation and the impact of innovations in late prehistoric Eurasia. My impression after reading the contributions to this book is that the chapters that are most successful in addressing the questions

posed are those that develop micro-scale and comparative approaches, whereas those seeking to address questions through a macro-scale perspective are only able to provide limited answers. This seems to be partly due to the scarcity of high-resolution data on intensification, specialization, technology, interaction, and local appropriation processes during late prehistory for many European regions and sites. Arguably, one of the key contributions of the volume as a whole is that it highlights the value of high-resolution research to contribute to understanding of long-term, broad scale developments—demonstrated in some of the chapters—and that there is a need for further adoption of proper analytical approaches and high-resolution research for studying innovations as socially embedded phenomena.

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Françoise Bostyn, Yves Lanchon and Philippe Chambon, eds. *Habitat du Néolithique ancien et nécropoles du Néolithique moyen I et II à Vignely 'La Porte aux Berges', Seine-et-Marne* (Paris: Société préhistorique française, 2018, 433pp., 285 colour illustr., pbk, ISBN 2-913745-75-X)

The fifth millennium cal BC in northern France is framed by the arrival of farming at the end of the sixth millennium and its

move northwards at the start of the fourth millennium. This does not mean, however, that the fifth millennium was a